

CLAIMS

1. (Currently amended) A gas filter for removing oil mist from a gas comprising a cylindrical case and a filter element provided inside said cylindrical case, an inlet hole and an outlet hole being formed in said cylindrical case, the gas filter having a structure such that said filter element comprises a filtration portion formed to have a cylindrical shape;

said filter element is provided inside said cylindrical case so that the inside of said cylindrical case is divided into an inner peripheral space surrounded by the inner peripheral surface of said filtration portion, and an outer peripheral space surrounded by the outer peripheral surface of said filtration portion and the inner surface of said cylindrical case;

said inlet hole is formed in said cylindrical case so as to communicate with said inner peripheral space, said outlet hole is formed in the upper portion of said cylindrical case so as to communicate with said outer peripheral space, gas introduced from said inlet hole into said inner peripheral space is caused to pass through said filtration portion, outflow into said outer peripheral space and outflow to the outside from said outlet hole, and oil mist contained in said gas is separated and removed by said filter element, wherein

said filtration portion is composed of only two layers of only two filtration materials being a first layer of a first filtration material formed to have a cylindrical shape with an inner cylindrical surface communicating with said inner peripheral space and a second layer of a second filtration material formed to have a cylindrical shape in intimate contact with the outer peripheral surface of said first filtration material and with an outer cylindrical surface communicating with said outer peripheral space so that the gas passes initially through said first filtration material and subsequently through said second filtration material ;

said first filtration material is made of glass paper and said second filtration material is made of a nonwoven fabric ; and wherein a base material of said nonwoven fabric is any of PET, PE, PP, rayon, cotton, and Nylon and wherein:

said filter element is composed of a cylindrical inner tube having a plurality of orifices formed therein, said first filtration material being wound tightly around the outer peripheral surface of said inner tube, and said second filtration material being wound tightly around the outer peripheral surface of said first filtration material, and, so that the first filtration material can be wound a preselected different number of times to provide a layer of different thicknesses and the second filtration material can be wound a preselected different number of times to provide a layer of different thicknesses to adjust the filtration efficiency and the pressure drop.

2. (Cancelled)

3. (Original) The gas filter according to claim 2, wherein the upper and lower end portions of said inner tube having said first and second filtration materials wound therearound are closed with upper and lower end plates, a communication orifice communicating with said inner peripheral space is formed in said upper end plate, and said inner peripheral space communicates with said inlet hole via said communication orifice.

4. (Original) The gas filter according to claim 1, wherein a drain hole for draining oil accumulated inside is provided in the bottom portion of said cylindrical case.

5. (Cancelled)

6. (Original) The gas filter according to claim 1, wherein the gas is CNG (Compressed Natural Gas) containing oil mist, and the gas filter is provided inside a channel connected from a CNG supply source to the supply destination.

7. (Original) The gas filter according to claim 1, wherein said gas is an engine blow-by gas, and the gas filter is provided in a channel leading from a cylinder head of the engine in an engine blow-by gas circulation system to an intake system.

8. (Currently amended) A gas filter for removing oil mist from a gas comprising a cylindrical case and a filter element provided inside said cylindrical case, an inlet hole and an outlet hole being formed in said cylindrical case, the gas filter having a structure such that

said filter element comprises a filtration portion formed to have a cylindrical shape;
said filter element is provided so that the inside of said cylindrical case is divided into an inner peripheral space surrounded by the inner peripheral surface of said filtration portion, and an outer peripheral space surrounded by the outer peripheral surface of said filtration portion and the inner surface of said cylindrical case;

said inlet hole is formed in said cylindrical case so as to communicate with said outer peripheral space, said outlet hole is formed in the upper portion of said cylindrical case so as to communicate with said inner peripheral space, gas introduced from said inlet hole into said outer peripheral space is caused to pass through said filtration portion, inflow into said inner peripheral space and outflow to the outside from said outlet hole, and oil mist contained in said gas is separated and removed by said filter element, wherein

said filtration portion is composed of only two layers of only two filtration materials being a second filtration material formed to have a cylindrical shape with an outer cylindrical surface communicating with said outer peripheral space and a first filtration material formed to have a cylindrical shape in intimate contact with the outer peripheral surface of said second filtration material and with an outer cylindrical surface communicating with said outer peripheral space so that the gas passes initially through said first filtration material and subsequently through said second filtration material;

said first filtration material is made of glass paper and said second filtration material is made of a nonwoven fabric; and

wherein a base material of said nonwoven fabric is any of PET, PE, PP, rayon, cotton, and Nylon and wherein said filter element is composed of a cylindrical inner tube having a plurality of orifices formed therein, said second filtration material wound tightly around

the outer peripheral surface of said inner tube, and said first filtration material wound tightly around the outer peripheral surface of said second filtration material,
and, so that the second filtration material can be wound a preselected different number of times to different thicknesses and the second filtration material can be wound a preselected different number of times to different thicknesses to adjust the filtration efficiency and the pressure drop.

9. (Cancelled)

10. (Original) The gas filter according to claim 9, wherein the upper and lower end portions of said inner tube having said first and second filtration materials wound therearound are closed with upper and lower end plates, a communication orifice communicating with said inner peripheral space is formed in said upper end plate, and said inner peripheral space communicates with said outlet hole via said communication orifice.

11. (Original) The gas filter according to claim 8, wherein a drain hole for draining oil accumulated inside is provided in the bottom portion of said cylindrical case.

12. (Cancelled)

13. (Original) The gas filter according to claim 8, wherein the gas is CNG (Compressed Natural Gas) containing oil mist, and the gas filter is provided inside a channel connected from a CNG supply source to the supply destination.

14. (Original) The gas filter according to claim 8, wherein said gas is an engine blow-by gas, and the gas filter is provided in a channel leading from a cylinder head of the engine in an engine blow-by gas circulation system to an intake system.

15. (Previously presented) The gas filter according to claim 1, wherein the first and the second filtration materials each have a good wetting ability and the second

filtration material has a pore diameter larger than a pore diameter of the first filtration material to improve separation efficiency of oil mist from gas.

16. (Previously presented) The gas filter according to claim 8, wherein the first and the second filtration materials each have a good wetting ability and the second filtration material has a pore diameter larger than a pore diameter of the first filtration material to improve separation efficiency of oil mist from gas.

17. (Currently amended) A gas filter for removing oil mist from a gas comprising a cylindrical case and a filter element provided inside said cylindrical case, an inlet hole and an outlet hole being formed in said cylindrical case, the gas filter having a structure such that

said filter element comprises a filtration portion formed to have a cylindrical shape;

said filter element is provided inside said cylindrical case so that the inside of said cylindrical case is divided into an inner peripheral space surrounded by the inner peripheral surface of said filtration portion, and an outer peripheral space surrounded by the outer peripheral surface of said filtration portion and the inner surface of said cylindrical case;

said inlet hole is formed in said cylindrical case so as to communicate with said inner peripheral space, said outlet hole is formed in the upper portion of said cylindrical case so as to communicate with said outer peripheral space, gas introduced from said inlet hole into said inner peripheral space is caused to pass through said filtration portion, outflow into said outer peripheral space and outflow to the outside from said outlet hole, and oil mist contained in said gas is separated and removed by said filter element, wherein:

said filtration portion is composed of only a first layer of a first filtration material formed to have a cylindrical shape and only a second layer of a second filtration material formed to have a cylindrical shape in intimate contact with the outer peripheral surface of said first filtration material;

said first filtration material is made of glass paper and said second filtration material is made of a nonwoven fabric being any one of PET, PE, PP, rayon, cotton, and Nylon; and

the first and the second filtration materials each have a good wetting ability and the second filtration material has a pore diameter larger than a pore diameter of the first filtration material whereby oil mist is trapped and condensed in the first material and forms drops which increase in size by movement through the second material sufficiently to avoid being carried out through of the exit hole by gas flowing through the filter ;

and, so that the first filtration material can be formed to provide different thicknesses and the second filtration material can be formed to provide different thicknesses to adjust the filtration efficiency and the pressure drop.

18 (currently amended) A gas filter for removing oil mist from a gas comprising a cylindrical case and a filter element provided inside said cylindrical case, an inlet hole and an outlet hole being formed in said cylindrical case, the gas filter having a structure such that

said filter element comprises a filtration portion formed to have a cylindrical shape;

said filter element is provided so that the inside of said cylindrical case is divided into an inner peripheral space surrounded by the inner peripheral surface of said filtration portion, and an outer peripheral space surrounded by the outer peripheral surface of said filtration portion and the inner surface of said cylindrical case;

said inlet hole is formed in said cylindrical case so as to communicate with said outer peripheral space, said outlet hole is formed in the upper portion of said cylindrical case so as to communicate with said inner peripheral space, gas introduced from said inlet hole into said outer peripheral space is caused to pass through said filtration portion, inflow into said inner peripheral space and outflow to the outside from

said outlet hole, and oil mist contained in said gas is separated and removed by said filter element, wherein:

said filtration portion is composed only a second layer of a second filtration material formed to have a cylindrical shape and only a first layer of a first filtration material formed to have a cylindrical shape in intimate contact with the outer peripheral surface of said second filtration material;

said filtration portion is composed of a first filtration material formed to have a cylindrical shape and a second filtration material formed to have a cylindrical shape in intimate contact with the outer peripheral surface of said first filtration material;

said first filtration material is made of glass paper and said second filtration material is made of a nonwoven fabric being any one of PET, PE, PP, rayon, cotton, and Nylon; and

the first and the second filtration materials each have a good wetting ability and the second filtration material has a pore diameter larger than a pore diameter of the first filtration material whereby oil mist is trapped and condensed in the first material and forms drops which increase in size by movement through the second material sufficiently to avoid being carried out through of the exit hole by gas flowing through the filter ;

and, so that the second filtration material can be formed to provide different thicknesses and the first filtration material can be formed to provide different thicknesses to adjust the filtration efficiency and the pressure drop.

19 (previously presented) The gas filter of claim 1, wherein the pore diameter of the first filtration material is between 5 μ m and 20 μ m.

20 (previously presented) The gas filter of claim 8, wherein the pore diameter of the first filtration material is between 5 μ m and 20 μ m.

21 (previously presented) The gas filter of claim 17, wherein the pore diameter of the first filtration material is between 5 μ m and 20 μ m.

22 (previously presented) The gas filter of claim 18, wherein the pore diameter of the first filtration material is between 5 um and 20 um.

23. (Currently amended) A gas filter for removing oil mist from a gas comprising a case with an interior and a gas inlet and a gas outlet communicating with said interior and, a filter element provided in said interior between said gas inlet and said gas outlet,

said filter element comprising a filtration portion consisting only of two filtration materials being a first filtration material made of glass paper on only a gas inlet side of the filtration portion and a second filtration material made of a non-woven fabric in intimate contact with only a gas outlet side of the first filtration material, to define a flow path for gas extending from the gas inlet into the glass paper via the inlet side and out from the glass paper via the outlet side into and through the second filtration material and then to the gas outlet wherein:

the glass paper and the second filtration material each have a good wetting ability and the second filtration material has a pore diameter larger than a pore diameter of the glass paper whereby oil mist is trapped and condensed in the glass paper and forms drops which increase in size by movement through the second filtration material sufficiently to avoid being carried out through of the exit hole by gas flowing through the filter.

24 (previously presented) The gas filter of claim 23, wherein the pore diameter of the first filtration material is between 5 um and 20 um and the pore diameter of the second filtration material is 55um.